

MONTHLY WEATHER REVIEW,

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WAR DEPARTMENT,

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DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

INTRODUCTION.

In compiling the present Review, use has been made of the meteorological data reported from 424 stations, classified as Voluntary Observers, Army Post and Signal Service Stations. But few prominent features are noticeable in the meteorology of the month; an excess of rain is reported from the Upper Lake region, New England and the Middle Atlantic States, with temperatures decidedly above the average, being, in some portions, the warmest November recorded for forty years. Remarkable storms have not occurred within the United States, but severe gales and hurricanes seem to have prevailed over the North Atlantic.

BAROMETRIC PRESSURE.

In General.—The barometric pressure is shown, as usual, by the isobars on Map No. II. The area of highest average pressure is there shown to be central in the Lower Mississippi valley, while the average is almost equally high at Pembina. The lowest isobar, 29.90, passes northeastward through Nova Scotia and Cape Breton. As compared with the previous month the pressure has risen decidedly in the Lake region, the Southwest and southern Florida. As compared with November, 1875, the barometer has been higher in the Southwest and Northeast, but lower in the Lakes, Ohio valley and Middle States. As compared with November, 1874, the pressure has been very generally lower, and especially so in the Middle and Eastern States. As compared with November, 1873, the pressure has been lower in New England and probably the Canadian provinces.

Areas of High Barometer.—The principal areas of high barometer have been as follows: No. I.—On the 2nd the pressure rose in the Southwest with northerly gales, and the central highest barometer continued thereafter slowly moving northeastward, reaching Ohio on the afternoon of the 4th, and New Hampshire by 11 p. m. of the 5th, finally disappearing on the 6th over the Gulf of St. Lawrence and Cape Breton, where the pressure remained very high during the 7th, having been reinforced by colder air from the North and East.

No. II.—Central on the 7th in Texas, having moved thither during the 6th, whence it moved slowly eastward, reaching Georgia on the 10th and remaining in Georgia and Florida until the 13th.

No. III.—Advanced on the 12th southward from Manitoba, and was, 11 p. m. of the 13th, apparently central over eastern Dakota, by which time, also, northerly gales had begun on the Texas coast. By the morning of the 15th the remaining small area of high pressure was central in Indian Territory, and by the morning of the 16th, an additional flow of air southward over the Lakes seems to have given rise to a ridge of high pressure, extending from Texas northeastward over the St. Lawrence valley. The barometer continued high over Canada and New England until the 20th.

No. IV.—The northerly winds following low barometers Nos. VIII and IX had, by 11 p. m. of the 17th, extended southward to Kansas, and to the Texas coast by the 18th, at 4:35 p. m. On the morning of the 19th a ridge of high pressure extended from Manitoba to Texas, which, by 4:35 p. m., had contracted to a small area, central in Arkansas, whence it moved eastward over the Gulf States, separating the areas of low pressure Nos. IX and X.

No. V.—The cold northerly winds following low barometer No. X had, by midnight of the 21st, extended southward over the Texas coast, and the succeeding area of highest pressure extended, at 11 p. m. of the 22d, over Arkansas and the lower Missouri valley, and, on the morning of the 23d, was confined to Arkansas, whence it extended eastward, being, on the morning of the 24th, central in eastern Tennessee, after which, however, being reinforced from the west, the highest pressure remained in Texas.

No. VI.—From the 22nd to the 25th the pressure was high on the Pacific coast, while low barometer No. XIV was apparently passing southeastward through Manitoba. On the 27th, in the morning, rising barometer, with colder northerly winds, was reported in Dakota. By the morning of the 28th the pressure had risen west of the Lake region, with lower temperatures but light winds. By morning of the 29th decidedly colder northerly winds prevailed in Oregon, Montana and Dakota, which by the morning of the 30th extended over the Mississippi valley and Lake region, and westward to Rocky Mountain stations. The highest pressure reported at this time was 30.97, in Manitoba. At 11 p. m. the isobar 30.93 inclosed an elongated area extending from Yaukton to Pembina, and during the 1st of December isobars retained their positions nearly parallel to their meridian, while the highest barometer remained in the extreme Northwest. The high northerly winds attending this great area of high barometer prevailed on the 30th over the whole of the Gulf of Mexico.

Areas of Low Barometer.—The areas of low barometer during the month have not developed into any storms of remarkable severity, the only ones at all notable are those numbered I, II, VII and IX, and the "norther" of the 29th and 30th on the Gulf of Mexico. In the number and character of the storm-tracks, this month resembles Nov., 1873, and 1875; the tracks of the storms of Nov., 1874, seem to have lain farther north and west. The average velocity of the fifteen depressions recorded on map No. 1 is 22½ miles per hour, while the fourteen depressions of Nov., 1875, averaged 32 miles.

No. I.—This depression, which began on the 30th of October, was on the morning of the 1st of November apparently central in southeastern Kansas; it extended rapidly northeastward and maintained an elongated oval contour, while it also moved bodily northeastward over Lake Huron, and disappeared in Canada on the morning of the 3rd. The rain or snow-fall attending its progress was principally confined to its northern side. High northerly winds were reported on the coasts of Texas on the morning of the 2nd, and on the Lakes later in the day.

No. II.—The preceding depression was followed on the 3rd by rising barometer and southerly winds over the Northwest and Southwest, which, being met in Dakota and Minnesota by cold northerly winds and rising barometer, gave rise to a slight depression, with cloud and snow, which developed slowly during the 3rd and 4th, and on the afternoon of the 5th extended as a much-elongated oval from Minnesota to Indian Territory, while warm southerly winds, cloudy weather and light rain prevailed from the Gulf coast northward over the Upper Lakes. The storm-centre now moved more rapidly northeastward with an increasing central depression, which, on the afternoon of the 6th, was central in northern Michigan, at which time southeast winds and rains prevailed on Lake Ontario, south and southwest winds, with rain and snow, on Lakes Erie and Michigan, and cold north or northwest winds, with clear weather, from Manitoba to Texas. Brisk winds, increasing to gales, prevailed on the Texas coast and Lower Lakes at midnight of the 6th and morning of the 7th.

No. III.—This depression apparently formed during the 7th, off Cape Hatteras, where warm, southerly winds (apparently due to low barometer No. II) were met by the cold, northerly winds, due to the very high barometer that was formed east of Nova Scotia while No. II. was approaching the St. Lawrence valley. The exact track of No. III is quite uncertain, but it appears, on the morning of the 8th, to have passed between Maine and Nova Scotia, and to have been over the Gulf of St. Lawrence on the afternoon of the 9th.

No. IV.—The falling barometer that prevailed during the 9th, in Manitoba and Dakota, indicated the approach of the low barometer, whose centre was, on the morning of the 10th, a little west of Minnesota, whence it moved northeastward into British America, and is lost sight of in the very general depression which immediately followed.

No. V.—This depression was, probably, on the morning of the 10th a very considerable distance east of the Middle Atlantic coast. At midnight of the 10th it lay between Massachusetts and Nova Scotia, where it perhaps continued until the morning of the 12th. The afternoon and midnight maps of the 12th show that it remained central near the Bay of Fundy, after which it moved eastward, and was probably entirely broken up.

No. VI.—The cold northerly winds following area No. IV, as they extended southward into Kansas, gave rise to depression No. VI, which extended on the morning of the 11th northeastward through eastern Nebraska, after which it turned southward through Iowa until it was, on the morning of the 12th, central in northern Missouri, when it turned northeastward over the Lakes and, on the 13th, disappeared in Canada, producing a very general depression, with warmer, southwest winds over the Lower Lakes and St. Lawrence valley, and followed by an area of very high pressure over the Northwest, Southwest and Upper Lakes.

No. VII.—On the morning of the 13th, while the preceding low barometer was in Canada, the extensive area of warm southerly winds over the Gulf States was sharply bounded on the west by the advancing southern edge of cold northerly winds; and on the afternoon of the 13th a belt of unusually strongly contrasted temperatures and opposing north and south winds extended from southern Texas to the Ohio valley. In this region was developed storm-centre No. VII, which advanced during the 14th northeastward to the Ohio valley and West Virginia, while northerly gales prevailed on the Texas coast. During the 15th, the

centre of low barometer moved eastward over the Middle Atlantic coast, while an area of high pressure advanced southward over the St. Lawrence valley and Lower Lakes to the Alleghanies.

No. VIII.—The low barometer which prevailed on the 14th in Oregon, was followed by a depression apparently central on the morning of the 15th in Dakota, whence it moved slowly southward, and disappeared on the 16th in the Missouri valley.

No. IX.—This depression is first definitely located on the afternoon of the 17th, although it may also be looked upon as a continuation of the previous area of low barometer. At midnight of the 17th the depression was central in Minnesota, with rapidly rising barometer and cold northwest winds, with snow, to the westward. The depression at first extended somewhat northward, but on the 18th moved rapidly in an unusually well-marked southeast direction into North Carolina, where it remained during the 19th, while an area of high pressure moved southward over New England. Cold easterly winds, with rain, prevailed from the 17th to 20th, inclusive, over the Middle Atlantic States, after which winds backed to northerly and the barometric depression moved northeastward until it disappeared on the 21st east of New England.

No. X.—The warm southerly winds that, on the 19th and 20th, advanced northward to the Gulf States, were met by cold northerly winds in Kansas and Nebraska, where low barometer No. X had its origin, and whence it moved northeastward, being on the morning of the 21st central in eastern Iowa, and disappearing on the 22nd north of Lake Huron. This storm was accompanied on the 21st and 22nd by rain and snow, with high winds at most stations on the Lakes.

No. XI.—The map of November 23d, 11 p. m., shows that warm northwest winds were prevailing in the higher portions of western Kansas, Nebraska and Dakota, while southerly winds, having much lower, but rapidly rising, temperatures, prevailed at the lower stations to the eastward in Minnesota, the Upper Mississippi and Lower Missouri valleys. As a consequence of this overflow of warm westerly winds the morning map of the 24th shows a slight depression, central in Minnesota, which moved eastward over Lake Michigan, and disappeared on the 26th among the mountains of the Middle States.

No. XII.—On the 24th a depression appears near Nova Scotia, and evidently northeastward some distance from the coast until on the afternoon of the 25th it was east of Cape Breton, where it appears to have remained nearly stationary during the 26th.

No. XIII.—An indefinite depression appears on the 24th and 25th to have moved northeastward over southern Florida. High winds prevailed for a short time at Punta Rasa and Key West.

No. XIV.—A third indefinite depression appears on the morning of the 27th in the Lake region, having moved southward, but apparently owing its existence to the very general light snows that prevailed. The low barometer that, at the same time, prevailed over the Gulf of St. Lawrence, extended westward, and these two appear to have merged into one on the 28th.

No. XV.—The low barometer that prevailed over Canada and the Gulf of St. Lawrence from the 26th to the 29th, was attended by a gentle flow of air southward over the Gulf States on the 27th, on which date a slight depression, with increasing cloudiness, began to form on the Gulf coast, and moved eastward on the 28th and over Georgia on the 29th, its track being along the northern limit of the southerly winds prevailing over Florida and the Gulf of Mexico. It was central on the afternoon of the 29th in Georgia, with a rapidly increasing area of cloud and rain. On the morning of the 30th it was central near Cape Hatteras, where the central barometer had decidedly fallen, while west of the Alleghanies the pressure had risen, being as high as 30.97 in Manitoba, and high northerly winds had extended southward to the West Gulf coast. During the rest of its course this storm-centre remained a short distance east of the Atlantic coast, but the area of cloud and snow extended over the greater part of the country east of the Mississippi, and the area of cold, high northerly winds which had reached Key West on the afternoon of the 30th was reported to have extended, with unusual severity and heavy rains, southward to the coast of Mexico, Central America and Isthmus of Darien.

Local Storms.—1st, at Fort Sill, I. T., heavy storm of wind and hail; 11th, violent snow-storm at Fort Pierre, Dak.; 19th, gales at Kensico, N. Y.; 19th and 20th, SE. to NE. gales at Flushing, N. Y.; 22nd, very heavy ocean swell reported for the past few days at Mt. Desert, Me.; 26th, severe wind-storm at Boulder City, Col.; 30th, severe NW. wind prevailed on Lake Erie, doing considerable damage to shipping; high wind and snow at Gainesville, Ga.

Storms encountered by vessels at sea have been reported as follows: On the 4th and 5th, $41^{\circ} 10' N.$, $59^{\circ} 30' W.$, barometer 29.30; on the 4th, a gale on the Gulf of Lyons, also a hurricane $24^{\circ} 30' N.$, $59^{\circ} 48' W.$; on the 7th, heavy "norther" $24^{\circ} 19' N.$, $90^{\circ} 09' W.$; on the 8th, terrific WNW. gale, lasting two days, $32^{\circ} 22' N.$, $32^{\circ} 22' W.$; 9th, heavy S. gale $38^{\circ} 25' N.$, $68^{\circ} 05' W.$; 10th, SE. gale $49^{\circ} N.$, $9^{\circ} W.$; 19th, severe NE. gale $26^{\circ} 30' N.$, $47^{\circ} W.$, also heavy gale, lasting two days, $35^{\circ} 20' N.$, $59^{\circ} 25' W.$; 20th, heavy sea $43^{\circ} 12' N.$, $66^{\circ} 18' W.$, also heavy rain-squall $34^{\circ} 32' N.$, $73^{\circ} 52' W.$; 21st, heavy NW. gale $51^{\circ} S.$, $76^{\circ} W.$; 27th, WSW. hurricane experienced by Bark Britannia, from Pernambuco, when midway between Cape Hatteras and New York.